

Article

Implementation status of morbidity and mortality conferences in Swiss hospitals: a national cross-sectional survey study

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Abstract

Objective: To determine the implementation status and current practice of morbidity and mortality conferences (M&MCs) in Switzerland.

Design: A national cross-sectional online survey was conducted in spring 2017. The questionnaire focused on overall goals, structure and procedures of hospital M&MCs. Further topics included satisfaction, perceived effectiveness and support requirements.

Setting: A total of 913 chief physicians of surgery and internal medicine, and specialist fields of obstetrics and gynaecology, anaesthesiology and intensive care from Swiss acute care hospitals were invited to the survey. 321 completed the questionnaire, resulting in a 35.2% response rate.

Participants: Chief or senior physicians in charge of the M&MCs in their department.

Intervention: No intervention

Main Outcome Measures: Numbers and percentages of M&MCs within the surveyed disciplines fulfilling certain characteristics and procedural features.

Results: Among 321 respondents, the majority are conducting M&MCs in their departments. Within and between the medical disciplines considerable heterogeneity was found in structural and procedural features of M&MCs. Only a small part of the reported M&MCs is following a systematic approach and meeting recommended procedural features. Although the respondents are satisfied and perceive the M&MCs as an efficient tool, they agree that there is a need for professionalization and standardization.

Conclusion: M&MCs are widely used to promote medical education, patient safety and quality improvements. However, the term M&MC seems to cover different types of meetings. Although the overall goals are similar, various types of M&MCs are used in practice and different objectives are pursued. Tools such as checklists, guidelines and templates are considered helpful.

Key words: morbidity and mortality conferences, patient safety, quality improvement, hospital, medical education, organizational learning

Introduction

Morbidity and mortality conferences (M&MCs) have a long tradition as a forum for continuing medical education in English speaking countries. Traditionally, they were used by surgeons to retrospectively discuss medical errors, complications or unexpected deaths [1]. In recent decades, M&MCs have been recognized internationally as a powerful tool for promoting patient safety [2–4]. Other medical disciplines such as obstetrics and gynaecology, intensive care [5], and internal medicine [6] have adopted M&MCs. Additionally, M&MCs are becoming more and more interdisciplinary and interprofessional, connecting physicians from different specialties, nurses and other staff to focus on common learning from medical errors and complications [7].

International studies identified ambiguities in goals and tasks of M&MCs, heterogeneity in their implementation and structure, an absence of standardized mechanisms to identify and address errors, as well as a lack of adequate and timely follow-up [1, 6, 8–11]. Differences were found across departments [8], for instance between internal medicine and surgery [1], as well as within specific disciplines [14, 15]: differences were detected with respect to the number and type of cases discussed during M&MCs [12, 13] as well as in the way cases were presented [1] and reviewed [8]. Aboumatar *et al.* found significant variation in the organization of M&MCs even within a single institution [8]. Both content and goals of conferences varied across departments. Among 12 departments, there were several approaches in reviewing cases. Most conferences focused on issues of medical management, but less than half concentrated on patient safety or quality issues. Pierluissi *et al.* [1] found differences between internal medicine and surgery conferences with respect to the format, numbers and frequency of adverse events and errors in cases presented, time spent on the case presentation and discussion.

While M&MCs originally focused on improving individual practice by critically reflecting on completed cases, they are now increasingly taking a system-oriented perspective. Standardized and structured approaches to case discussion as well as error and incident analysis (e.g. Fishbone analysis) [3] are being integrated to detect systemic problems, e.g. in the organization of care or the interaction of medical staff and physicians. Other studies showed that standardized presentations can have an impact on participant satisfaction [16] and M&MCs using a formalized framework were perceived as being more effective [9, 13].

In Switzerland, M&MCs are part of the continuing education programs of most medical disciplines recognized by the Swiss Institute for Continuing Medical Education [17]. However, little is known about their implementation status, the characteristics of M&MCs within different medical disciplines and the pursued goals. The aim of this study was to determine the implementation status and spread of M&MCs in Switzerland. We focused on the organizational structure, procedures and characteristics of M&MCs in Swiss acute care hospitals. Chief physicians served as our key informants for obtaining data about M&MCs at their departments.

Methods

A cross-sectional survey was conducted in spring 2017.

Survey instrument

Since this was the first national survey related to M&MCs, a new questionnaire was designed. The survey was based on an extensive review of the available literature, assessments of national experts and

internationally established guidelines, e.g. the Recommendations of the German Medical Association [18], the Ottawa M&M Model [19], or Models from Surgery in England [20, 21]. The questionnaire comprised three sections: The participants were first asked whether a M&MC is currently implemented at the clinic or department. Participants without M&MCs were asked whether they would be interested in introducing M&MCs. Participants with existing M&MC were administered the remaining survey sections. The second section included questions about the overall goals as well as structure and process characteristics of M&MCs (29 items). In the third section, the satisfaction and perceived effectiveness of the M&MCs were assessed. The questionnaire ended asking whether and how M&MC could be improved and the sentence ‘M&MCs as a tool to learn from errors could bring more benefit if ...’ which the respondents had to complete. At the end of the survey, socio-demographic questions were asked. Answer options were binary or categorical and some questions provided free-text fields. The final questionnaire had 44 items in total. The German language draft version of the survey was tested for functionality, comprehension and acceptance in a small group of senior physicians. The resulting feedback was integrated in the survey. As Switzerland is a multilingual country the survey developed in German was subsequently translated into French and Italian by professional translators. The translations were approved by native speakers. The survey was programmed as a secured online survey with individual access codes.

Sample and procedures

The target group included chief physicians of surgery, internal medicine, obstetrics and gynaecology, anaesthesiology and intensive care of all Swiss acute care hospitals. An invitation letter was sent by post and e-mail to a total of 913 chief physicians. The letter introduced the study and its aims and provided them with the survey URL and personal access code. Chief physicians were allowed to delegate survey participation to the person in charge of the M&MCs in their department. An electronic reminder was sent two weeks after the initial invitation. The survey was officially sent, fielded and coordinated by the Swiss Patient Safety Foundation and co-signed by the Swiss Medical Association (FMH). The study was exempt from review by the Cantonal Ethics Board (BASEC-Req-2017-00 325). Survey participation was considered informed consent.

Data analysis

Results are presented as numbers and percentages (%). To test for differences in characteristics of reported M&MCs between medical disciplines Chi2 test and Fishers exact test (for cell counts ≤ 5) were used as appropriate. The Kruskal–Wallis test was used to test for differences in ordinal outcomes between medical disciplines. A P -value < 0.05 was considered statistically significant. Responses to open-ended questions were analysed for content and qualitatively coded by two of the authors. Coding was discussed within the research team.

Results

Sample

Of the 913 invited physicians, 321 completed the survey, resulting in a 35.2% response rate. Compared to the entire sample, surgical disciplines (35.8% vs. 32.2%) and anaesthesiology/intensive care (25.2% vs. 21.5%) disciplines are slightly overrepresented whereas internal medicine disciplines (32.7% vs. 37.4%) and obstetrics/

gynaecology (6.2% vs. 9.0%) are underrepresented among survey participants ($\chi^2 = 0.006$). The majority of respondents are chief physicians (77.5%) and senior physicians (21.3%). Sample characteristics are presented in Table 1.

The majority of participating physicians indicated that M&MCs are implemented in their clinic or department (69.5%). From the 98 participants, who do not conduct M&MCs, the majority is interested (44.3%) or rather interested (43.3%) in incorporating M&MC into their future practice. There are several differences between respondents with and without M&MCs (Table 1).

Description of M&MCs in Swiss hospitals

The following analysis is based on the 223 individuals, who confirmed that M&MCs are conducted in their clinic or department. Table 2 summarizes the main characteristics of M&MCs as currently implemented.

M&MCs goals

Respondents could choose three out of five M&MC goals representing individual and organizational learning. The most commonly reported overall goals of M&MCs are 'Preventing recurrence of errors' (95.5%), 'Identifying problems in the processes' (83.0%) and 'Improving collaboration between professionals and departments' (60.5%) (Figure 1). These goals all relate to organizational learning. Goals representing individual learning, such as 'Expanding individual knowledge' (39.5%) and 'Learning about rare diseases' (6.3%)

were reported less frequently. 57.9% of respondents reported a combination of both individual and organizational learning goals.

There are considerable differences in reported goals between disciplines (Figure 1). 'Preventing recurrence of errors' is essential for representatives of surgery (100%) but less so for representatives of other medical disciplines (92.1%, $P = 0.005$). 'Improving collaboration' was most widely chosen by responders working in anaesthesiology and intensive care (75.0%) compared to surgery (49.5%), internal medicine (63.6%) or obstetrics/gynaecology (66.7%).

M&MCs characteristics

Main characteristics of current M&MCs are listed in Table 2. Most departments hold conferences monthly or quarterly and commonly discuss two to three cases. Overall, chief and senior physicians (92.8% and 97.3% respectively) and residents (94.6%) belong to the most frequent M&MC attendees. Almost half of the departments include participants from other disciplines for their M&MCs (e.g. pharmacists, pathologists or radiologists). In 46.2% of the departments, nurses usually attend M&MCs.

The respondents could choose up to three types of cases that are usually presented in M&MCs. Typically presented cases in M&MCs are complications (78.0%), unexpected mortality (50.7%) and severe illnesses or progressions (28.7%). Some departments include incidents and critical events without or with patient harm (27.8% vs. 18.4%). Cases are selected based on problems in cooperation (39.5%), deficits in organizing care (15.7%) and gaps in

Table 1 Demographics of survey participants

		Total sample N = 321 (100%)	M&MCs currently implemented N = 223 (69.5%)	M&MCs currently NOT implemented N = 98 (30.5%)	P-value
		n	n (%)	n (%)	
Survey language	German	232	168 (72.4)	64 (27.6)	0.040 ^a
	French	73	48 (65.8)	25 (34.2)	
	Italian	16	7 (43.8)	9 (56.3)	
Function ⁺	Chief physician	248	170 (68.5)	78 (31.5)	0.348 ^b
	Senior physician	68	51 (75.0)	17 (25.0)	
	Other physician	4	2 (50.0)	2 (50.0)	
Gender ⁺	Female	37	26 (70.3)	11 (29.7)	0.935 ^a
	Male	283	197 (69.6)	86 (30.4)	
Hospital categories ⁺	University hospital	67	55 (82.1)	12 (17.9)	<0.001 ^a
	General hospital with ≥500 beds	48	38 (79.2)	10 (20.8)	
	General hospital with 125–499 beds	117	85 (72.7)	32 (27.3)	
	General hospital with ≤124 beds	63	39 (61.9)	24 (38.1)	
	Special clinics	24	6 (25.0)	18 (75.0)	
Legal structure ⁺	Public hospital	272	198 (72.8)	74 (27.2)	0.009 ^a
	Private hospital	47	25 (53.2)	22 (46.8)	
Medical disciplines	Surgery	115	97 (84.4)	18 (15.6)	<0.001 ^b
	Internal medicine	105	55 (52.4)	50 (47.6)	
	Anaesthesiology and intensive care	81	56 (69.1)	25 (30.9)	
	Obstetrics/gynaecology	20	15 (75.0)	5 (25.0)	
Number of beds in department ⁺	Up to 20	52	32 (61.5)	20 (38.5)	0.159 ^b
	21–40	64	46 (71.9)	18 (28.1)	
	41–60	50	38 (76.0)	12 (24.0)	
	61–80	33	28 (84.8)	5 (15.2)	
	Over 80	53	37 (69.8)	16 (30.2)	
	Not applicable	67	42 (62.7)	25 (37.3)	

⁺Not adding up to n = 321 in the total sample due to missing values.

^a χ^2 test for differences between respondents with/without implemented M&MC.

^bFisher exact test for differences between respondents with/without implemented M&MC when cell counts are ≤5.

Table 2 Characteristics by medical disciplines

	Total N = 223		Internal medicine N = 55		Anaesthesiology & intensive care N = 56		Surgery N = 97		Obstetrics/ gynaecology N = 15		P-value
	n	(%)	n	(%)	n	(%)	n	(%)	n	%	
Frequency ⁺											
Weekly/fortnightly ⁺⁺	35	(15.8)	4	(7.3)	4	(7.1)	26	(27.1)	1	(6.7)	0.001 ^a
Monthly	46	(20.7)	7	(12.7)	11	(19.6)	24	(25.0)	4	(26.7)	
Quarterly	98	(44.1)	25	(45.5)	28	(50.0)	36	(37.5)	9	(60.0)	
Rarely than quarterly/irregular ⁺⁺	43	(19.4)	19	(34.6)	13	(23.2)	10	(10.4)	1	(6.7)	
Duration											
≤30 min ⁺⁺	50	(22.4)	9	(16.4)	6	(10.7)	33	(34.0)	2	(13.3)	0.0292 ^a
31–45 min	58	(26.0)	17	(30.9)	15	(26.8)	22	(22.7)	4	(26.7)	
46–60 min	84	(37.7)	20	(36.4)	26	(46.4)	32	(33.0)	6	(40.0)	
>60 min	31	(13.9)	9	(16.4)	9	(16.1)	10	(10.3)	3	(20.0)	
Number of attendees ⁺											
3–10 attendees	73	(32.7)	12	(21.8)	23	(41.0)	36	(37.1)	2	(13.3)	0.0270 ^a
11–20 attendees	83	(37.2)	20	(36.4)	19	(33.9)	37	(38.1)	7	(46.7)	
21–30 attendees	36	(16.1)	11	(20.0)	6	(10.7)	14	(14.4)	5	(33.3)	
>30 attendees	29	(13.0)	12	(21.8)	7	(12.5)	9	(9.3)	1	(6.7)	
Estimated participation rate of invited staff ⁺											
1–25%	15	(7.0)	7	(12.7)	7	(14.0)	0	(0.0)	1	(7.7)	< 0.001 ^a
26–50%	60	(28.0)	13	(23.6)	24	(48.0)	18	(18.8)	5	(38.5)	
51–75%	76	(35.5)	21	(38.2)	15	(30.0)	36	(37.5)	4	(30.8)	
76–100%	63	(29.4)	14	(25.5)	4	(8.0)	42	(43.8)	3	(23.1)	
No. of cases per M&MC											
1 case	59	(26.5)	22	(40.0)	15	(26.8)	19	(19.6)	3	(20.0)	0.225 ^a
2 cases	75	(33.6)	11	(20.0)	21	(37.5)	39	(40.2)	4	(26.7)	
3 cases	53	(23.8)	13	(23.6)	18	(32.1)	18	(18.6)	4	(26.7)	
≥4 cases ⁺⁺	36	(16.1)	9	(16.4)	2	(3.6)	21	(21.6)	4	(26.7)	
Time per case ⁺⁺⁺											
≤19 min ⁺⁺	70	(31.4)	12	(21.8)	11	(19.6)	42	(43.3)	5	(33.3)	0.0012 ^a
20–29 min	49	(22.0)	13	(23.6)	10	(17.9)	22	(22.7)	4	(26.7)	
30–44 min	61	(27.4)	17	(30.9)	19	(33.9)	23	(23.7)	2	(13.3)	
≥45 min	43	(19.3)	13	(23.6)	16	(28.6)	10	(10.3)	4	(26.7)	
Time per case for open discussion											
≤10 min ⁺⁺	76	(34.1)	13	(23.6)	17	(30.4)	40	(41.2)	6	(40.0)	0.466 ^a
11–15 min	70	(31.4)	20	(36.4)	21	(37.5)	25	25.8	4	26.7	
16–20 min	46	(20.6)	15	(27.3)	9	(16.1)	20	20.6	2	13.3	
≥20 min	31	(13.9)	7	(12.7)	9	(16.1)	12	12.4	3	20.0	
Presenter											
Chief physician	23	(10.3)	8	(14.6)	7	(12.5)	7	(7.2)	1	(6.7)	0.120 ^b
Senior physician	98	(44.0)	24	(43.6)	29	(51.8)	38	(39.2)	7	(46.7)	
Resident	88	(39.5)	19	(34.6)	15	(26.8)	49	(50.5)	5	(33.3)	
Other	14	(6.3)	4	(7.3)	5	(8.9)	3	(3.1)	2	(13.3)	

Fisher exact test for differences between respondents from different medical disciplines when cell counts are ≤ 5 .

The physicians were asked to complete the sentence 'M&MCs as a tool to learn from errors could bring more benefit if ...'. Answers were sorted into categories by consensus of the authors. Answers most frequently related to 'an open learning and error culture' (18.1%), followed by 'better and interdisciplinary participation' (12.8%) and 'a consistent implementation of the M&MCs itself and of the defined improving measures' (12.1%). 'Higher frequency' (10.7%) and 'a systematic approach' (10.1%) were also proposed as to generate more benefit from M&MCs. At the end of the survey, the physicians were asked if their M&MC could be improved and how this may be achieved. 65.0% of the respondents agreed that they see potential for improvement and suggested various materials as helpful (Table 4).

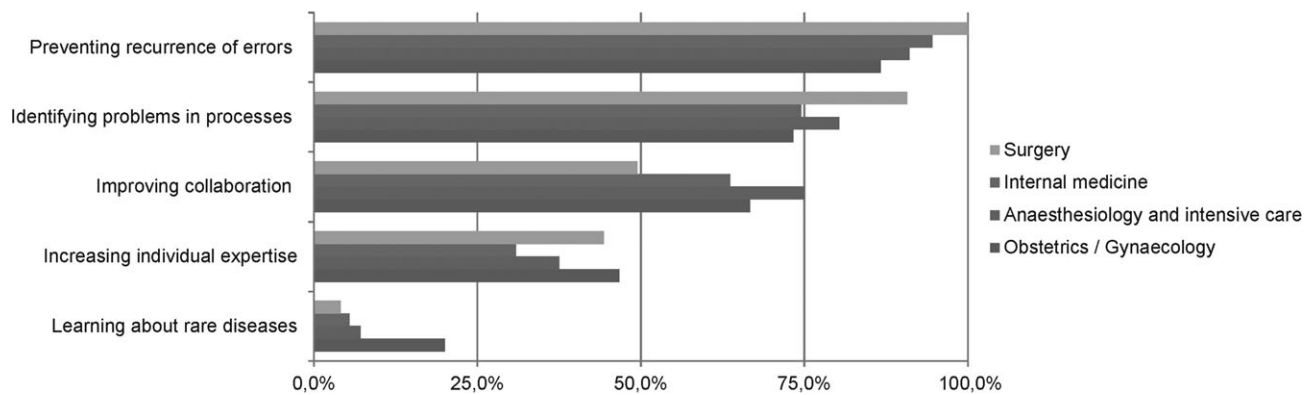


Figure 1 Overall goals.

Discussion

Our study is the first to provide data on the current implementation and design of M&MCs in Switzerland. The results show that M&MCs are widely implemented within the surveyed medical disciplines in Swiss hospitals. Considering the relatively high response rate in chief physicians and the fact that nearly 87.6% reported intentions to implement M&MCs indicate a considerable interest in the topic.

Although M&MCs seem to be established in Swiss Hospitals they are variable in their structure. Some clinics follow a systematic pattern while others are determined by personal preferences of the chair or availability of time and resources. As others, we find considerable heterogeneity in structural and procedural features of implemented M&MCs within and between the medical disciplines [1, 8, 13, 16]. The differences in frequency, duration and number of cases discussed confirm that different approaches exist and that M&MC is an umbrella term covering several types of meetings. Chief physicians seem to pursue a variety of goals with the M&MC, focusing on organizational learning goals more than on individual learning goals. Structural and procedural variation could be explained by the fact that M&MCs as a whole are currently shifting from the traditional educational instrument for medical trainees towards improving patient safety [2, 7, 13]. However, such a change in focus needs to be accompanied by adequate structural and procedural support. For example, a M&MC aimed at organizational learning and involving different professional groups could probably not be held weekly with four cases discussed within 30 min. Importantly, a less formalized approach may be useful to begin to establish a culture of open discussion about errors within a profession. The unit's goals must be reflected in its culture as well as in its structural and procedural features and should be developed accordingly and relative to another.

Many of the M&MCs reported about have characteristics that do not match recommendations in the recent literature. For example, nearly every second department covered in our study holds the M&MCs quarterly, while weekly, fortnightly or monthly settings have been recommended [6, 8, 9, 22]. However, regular meetings may be more important than higher frequency of M&MCs [25]. Standardized procedures are not yet common in Swiss Hospitals. There is room for an increased adoption of clear case selection criteria, standardized models, discussion along key questions, protocols and consistent follow-up. It is noteworthy that nearly 50% of departments do not yet have clear criteria and procedures for case selection. A well-defined selection procedure is important to ensure that relevant

cases are not missed, to increase transparency and reliability, and to avoid that M&MCs are misused to expose colleagues. Lack of knowledge and of time, as reported by other studies [15], could be a reason why analytical methods are underused. Many authors recommend using a moderator in M&MC [5, 22], for example, a senior physician or an experienced resident [26]. Based on our data we can identify potential for improvement concerning the use and training of moderators: In our sample, M&MCs were mostly moderated and chaired by the same person in a dual role and training of moderators was rather uncommon. Less than a quarter of respondents use guidelines on the analysis and presentation of cases. It is interesting to note that we observed an association of these procedural features with participants' perceived effectiveness of the M&MCs, suggesting that chief physicians see the benefits of a structured approach. This result is consistent with the literature [15, 16]. Several studies reported higher satisfaction scores associated with M&MCs incorporating structured formats and case analysis [3, 9, 27, 28]. Of course, the causality of this association and its direction remain unclear.

Overall, the survey shows that the majority of respondents are satisfied with the current implementation of their M&MC and perceive the instrument as effective for patient safety. Still, two-thirds of respondents felt that there was room for improvement for the M&MC in their department. Respondents in our survey consider tools such as a checklist for preparation, guidelines and templates as conducive to increased benefits.

Limitations

The main limitation of this survey study is the self-reported nature of our data. The study has standard limitations associated with a response rate below 100%. Nonetheless, the response rate was relatively high considering the target group. Given that the chief physicians are describing their own M&MC results may also be subject to social desirability bias. Although chief physicians are best positioned to describe the structural and procedural characteristics, a more reliable assessment would come from direct observation of M&MCs or surveying all participants. Our study does not provide information on achievement of specific goals or impact measures. Because of the heterogeneity of M&MC models and the reported implementation, comparisons across the medical disciplines are limited and should be made with caution. Despite these limitations, we identify a positive trend in the development and acceptance of M&MCs.

Table 3 Procedural features of M&MCs

For the M&MC in our department	Total N = 223		Internal medicine N = 55		Anaesthesiology & intensive care N = 56		Surgery N = 97		Obstetrics/ gynaecology N = 15		P-value
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	
Cases are selected by defined criteria	92	(41.3)	17	(30.9)	12	(21.4)	52	(53.6)	11	(73.3)	<0.001 ^b
Cases are prepared and reviewed in a standardized way	126	(56.5)	25	(45.5)	23	(41.1)	65	(67.0)	13	(86.7)	<0.001 ^b
Cases are analysed and presented using a model or guidelines	54	(24.2)	12	(21.8)	10	(17.9)	27	(27.8)	5	(33.3)	0.417 ^b
Cases are discussed along key questions	64	(28.7)	22	(40.0)	11	(19.6)	26	(26.8)	5	(33.3)	0.108 ^b
Person who moderates received training in moderation	59	(29.1)	10	(19.6)	15	(28.8)	26	(30.6)	8	(53.3)	0.086 ^a
Improvement measures are defined during the M&MC	204	(91.5)	52	(94.6)	50	(89.3)	87	(89.7)	15	(100.0)	0.509 ^b
Results are recorded in a protocol or written summary	82	(36.8)	22	(40.0)	17	(30.4)	34	(35.1)	9	(60.0)	0.184 ^a
Results are disseminated internally	124	(55.6)	30	(54.6)	31	(55.4)	51	(52.6)	12	(80.0)	0.264 ^b
Attendees receive feedback on the implementation of the defined measures	86	(38.6)	21	(38.2)	20	(35.7)	34	(35.1)	11	(73.3)	0.045 ^b
Suggestions for improvement of the M&MC by staff are actively sought	122	(54.7)	29	(52.7)	34	(60.7)	47	(48.5)	12	(80.0)	0.098 ^b

^aChi² test for differences between respondents from different medical disciplines.^bFisher exact test for differences between respondents from different medical disciplines when cell counts are ≤5 (including not shown cells of 'no responses').**Table 4** Suggestions for helpful M&MC tools

	n	%
Checklist for preparation	148	66.4
Guidelines for conducting M&MCs	131	58.7
Templates for presentation	102	45.7
Training offers for moderation	88	39.5
Minimal standards	72	32.3
Others	25	11.2

Conclusion

No standard approach to the M&MC currently exists in Switzerland. The M&MCs varied widely in their goals and characteristics. Different formats are established depending on the medical disciplines and settings. This survey provides an overview of M&MCs in Swiss hospitals, and may be a starting point to discuss and develop measures for improvement and increased effectiveness. We find that some characteristics are associated with a perceived higher effectiveness of M&MCs and recommend structured approaches and interdisciplinary audience to improve M&MCs and development towards a system-wide approach. M&MCs should be implemented regularly and in a more structured manner. The implementation of procedural features can be improved, for example, by discussing cases along key questions, by training moderators or recording the results in a protocol or written summary. Respondents consider checklists, guidelines for conducting M&MCs and templates for presentation as helpful tools. We recommend such tools to institution who like to support their medical professionals in conducting M&MCs. Institutions who would like to assess their own practices could use our list of features to check the extent the procedural features have been implemented in their departments.

Further studies are needed to investigate the perception of all participants of M&MCs, the impact of M&MCs on patient safety and how to improve and standardize the conference.

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References

1. Pierluissi E, Fischer M, Campbell A *et al.* Discussion of medical errors in morbidity and mortality conferences. *JAMA* 2003;290:2838–42.
2. Deis JN, Smith KM, Warren MD *et al.* Transforming the morbidity and mortality conference into an instrument for systemwide improvement. In: Henriksen K, Battles J, Keyes M, Grady M, editors. *Advances in Patient Safety: New Directions and Alternative Approaches* (Vol 2: Culture and Redesign). Rockville: Agency for Healthcare Research and Quality; 2008.
3. Szostek JH, Wieland ML, Loertscher LL *et al.* A systems approach to morbidity and mortality conference. *Am J Med* 2010;123:663–8.
4. Tady DB, Pierce RG, Pell JM *et al.* Leveraging a redesigned morbidity and mortality conference that incorporates the clinical and educational

- missions of improving quality and patient safety. *Acad Med* 2016; DOI:10.1097/ACM.0000000000001150.
5. Ksouri H, Balanant PY, Tadié JM *et al.* Impact of morbidity and mortality conferences on analysis of mortality and critical events in intensive care practice. *Am J Crit Care* 2010;19:135–45.
 6. Orlander JD, Fincke BG. Morbidity and mortality conference: a survey of academic internal medicine departments. *J Gen Intern Med* 2003;18:656–8.
 7. Orlander JD, Barber TW, Fincke BG. The morbidity and mortality conference: the delicate nature of learning from error. *Acad Med* 2002;77:1001–6.
 8. Aboumatar HJ, Blackledge CG, Dickson C *et al.* A descriptive study of morbidity and mortality conferences and their conformity to medical incident analysis models: results of the morbidity and mortality conference improvement study, phase 1. *Am J Med Qual* 2007;22:232–8.
 9. Higginson J, Walters R, Fulop N. Mortality and morbidity meetings: an untapped resource for improving the governance of patient safety? *BMJ Qual Saf* 2012;21:576–85.
 10. Seigel TA, McGillicuddy DC, Barkin AZ *et al.* Morbidity and mortality conference in emergency medicine. *J Emerg Med* 2010;38:507–11.
 11. Benassi P, MacGillivray L, Silver I *et al.* The role of morbidity and mortality rounds in medical education: a scoping review. *Med Educ* 2017;51:469–79.
 12. Rothmund M, Kohlmann T, Heidecke C *et al.* Patientensicherheit in chirurgischen Kliniken: Ergebnisse einer aktuellen Online-Befragung [in German]. *Z Evid Fortbild Qual Gesundheitswes* 2015;109:384–93.
 13. Cifra CL, Bembea MM, Fackler JC *et al.* The morbidity and mortality conference in PICUs in the united states: a national survey. *Crit Care Med* 2014;42:2252–7.
 14. Gore DC. National survey of surgical morbidity and mortality conferences. *Am J Surg* 2006;191:708–14.
 15. Lecoanet A, Vidal-Trecan G, Prate F *et al.* Assessment of the contribution of morbidity and mortality conferences to quality and safety improvement: a survey of participants' perceptions. *BMC Health Serv Res* 2016; 16. DOI:10.1186/s12913-016-1431-5.
 16. Kim MJ, Fleming FJ, Peters JH *et al.* Improvement in educational effectiveness of morbidity and mortality conferences with structured presentation and analysis of complications. *J Surg Educ* 2010;67:400–5. DOI:10.1016/j.jsurg.2010.04.005.
 17. Schweizerisches Institut für ärztliche Weiter- und Fortbildung, Register für zertifizierte Weiterbildungsstätte, Switzerland [in German]: <http://www.fmh.ch/bildung-siwff/fachgebiete/facharztztitel-und-schwerpunkte.html>. (25 August 2017, date last accessed).
 18. Boy O, Chop I. *Methodological Guidelines for Morbidity and Mortality Conferences [in German]*. Berlin: Bundesärztekammer, 2016.
 19. Calder LA, Kwok ESH, Cwinn AA *et al.* Ottawa M&M Modell. Ottawa: 2012. http://www.emottawa.ca/assets_secure/MM_Rounds/CalderMM-Rounds-Guide-2012.pdf (25 August 2017, date last accessed).
 20. Dargon PT, Mitchell EL, Sevdalis N Model of Imperial Collage: Morbidity and Mortality Conference Manual. London: 2012. <http://www.imperial.ac.uk/media/imperial-college/medicine/surgery-cancer/pstcr/mmmanualv1.1dec2012rev.pdf> (25 August 2017, date last accessed).
 21. The Royal College of Surgeons of England. Morbidity and mortality meetings: a guide to good practice. London: 2015. <https://www.rcseng.ac.uk/library-and-publications/college-publications/docs/morbidity-mortality-guide/> (25 August 2017, date last accessed).
 22. Mitchell EL, Lee DY, Arora S *et al.* SBAR M&M: a feasible, reliable, and valid tool to assess the quality of, surgical morbidity and mortality conference presentations. *Am J Surg* 2012;203:26–31.
 23. Martin J, Rohn C Guidelines for interdisciplinary M & M conferences. In: Manual IQM [in German]. 2. Auflage. Berlin: MWV Medizinische Wissenschaftliche Verlagsgesellschaft und IQM Initiative Qualitätsmedizin e.V. 2017. p. 175–82.
 24. Taylor-Adams S, Vincent C Systems analysis of clinical incidents – the london protocol. London: 2007. https://www1.imperial.ac.uk/resources/C85B6574-7E28-4BE6-BE61-E94C3F6243CE/londonprotocol_e.pdf (25 August 2017, date last accessed).
 25. Department of Health & Human Services. Partnering for performance – a performance development and support process for senior medical staff. In: *Mortality and Morbidity Reviews/Case Discussion Meetings*. Melbourne: Quality, Safety and Patient Experience Branch, Hospital & Health Service Performance, Victorian Government, 2010: 119–23.
 26. Becker A. An overview of the quality criteria of successful morbidity and mortality conferences. In: *Contributions to Patient Safety in Hospitals (in German)*. Kulmbach: Mediengruppe Oberfranken, 2015: 95–135.
 27. Kwok ESH, Calder LA, Barlow-Krelina E *et al.* Implementation of a structured hospital-wide morbidity and mortality rounds model. *BMJ Qual Saf* 2017;26:439–48.
 28. Murayama KM, Derossis AM, DaRosa DA *et al.* A critical evaluation of the morbidity and mortality conference. *Am J Surg* 2002;183:246–50.